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## METEOROLOGY IN NEW ZEALAND.

By The Editor.

One of the good results of a particularly ill wind was the opportunity recently presented to me of paying a long visit to the Dominion of New Zealand, a visit the projected length of which was doubled as a consequence of the disorganization of traffic, resulting from a great strike of wharf labourers.

During the three-and-a-half months which I spent there I saw much of the Dominion Meteorologist, Mr. D. C. Bates, whose acquaintance I had formed by correspondence nearly twenty years before, and for whose energy and enthusiasm I was well prepared. I have now to acknowledge with gratitude the personal kindness I received from him, not only in Wellington, but through his introductions in all parts of the Dominion. Although at the time I was not able to take full advantage of the opportunities which Mr. Bates so generously placed at my disposal, for making a complete study of the meteorological system of New Zealand, I was yet able, in the course of a tour, which extended from Stewart Island in the south, to the Bay of Islands in the north, to visit a large number of meteorological stations, and to make the acquaintance of many of the Observers. For facilitating this journey I must specially acknowledge the courtesy of the Government in connection with the Tourist Department and the railways.

It is always difficult for those at home to realise the conditions of a distant land, and in the case of New Zealand this difficulty is increased by the extremely close resemblance of the details of life to those at home. Indeed, of all the overseas dominions, colonies, or other possessions of the British Crown which I have visited, and I have had the good fortune to travel in most of them, New Zealand is the only one in which at times one could forget that one was not in England. The smoothness of the routine of all the essentials of civilised life makes it the more difficult to realise the difference in the conditions under which the various departments at work are carried on. From the meteorological point of view

this is particularly the case. New Zealand is scarcely smaller in area than the British Isles, but it ranges through a greater stretch of latitude, reaching as it does for nearly 1000 miles from north to south, from latitude 34° S. to latitude 47° S. The first feature of the climate which strikes a visitor from the old country is that despite the fact that the whole of Great Britain lies nearer to the Pole than any part of New Zealand, the climates of the two are singularly alike; indeed, the summer in the South Island of New Zealand struck me as certainly no warmer and decidedly more capricious in the alternations of temperature, than that of England. The lower latitude, however, insures a greater intensity of sunlight and correspondingly shorter days in the summer and shorter nights in the winter, and the evidence of vegetation proves conclusively that the mean temperature of the winter is much higher in New Zealand than in Great Britain. The climate of the west of Ireland may, indeed, be compared very closely with that of the extreme south of New Zealand. The luxuriance of vegetation in Stewart Island is suggestive of Co. Kerry, where many of the native New Zealand plants flourish as well as in their native home.

It is one of the most remarkable features of that unique little island, which assuredly should have retained its poetic Maori name of Rakiura, the Land of the Glowing Sky, that one seems to move in a temperate, and indeed a cool, temperate climate, amidst a vegetation of quite tropical appearance, tree ferns with other ferns and mosses clothing the land right down to the water's edge, while forest trees hung with climbers of very varied appearance, join with the undergrowth, making the interior practically impenetrable unless a way is cut.

The physical features of New Zealand differ completely in the two main islands. In the South Island the west is occupied by a continuous mountain range, rising in most places far above the snow line. For most of its length this cuts off communication between the two sides of the island, except for mountaineers able to negotiate snow passes. The few towns on the west coast are all at the northern end and they had only precarious communication by sea until the recent construction of railways, carried through difficult passes. The east of the South Island, on the contrary, is a continuous plain sloping gently from the western mountains to the sea, broken here and there with low hills which, when they reach the coast, form shelter for the few good harbours the island possesses. The South Island lies in the zone of the Roaring Forties, the prevailing wind being from the west, with the consequence that the western slopes of the mountains receive a very heavy rainfall, exceeding 100 inches in many places, while the grassy plains of the east have a rainfall below that of the eastern counties of England, much of the area having an average of less than 20 inches of rain. The North Island consists of a

great volcanic plateau in the centre, from which ridges of rocky hills run outwards in all directions to the sea, isolating between them comparatively small stretches of fertile plains and opposing great obstacles to convenient communication. The fine harbour of Wellington in the south, on the strait which separates the two islands, is connected by the Main Trunk railway line with the fine harbour of Auckland, in the northern peninsula, and with the less satisfactory seaports of New Plymouth on the west and Napier on the east. The climate of the North Island, on account of its latitude, is decidedly warm in summer, and although rarely cold enough for the formation of frost at sea level in winter, it is subject to cold winds, giving a marked contrast between the two seasons. The great Pacific Ocean extends north and east of New Zealand, on the south the Southern Ocean stretches to the Antarctic regions, and on the west the Tasman Sea which probably most people at home compare in breadth to the North Sea, is more comparable to the Atlantic Ocean, being wide enough to separate New Zealand from the continental influence of Australia. The whole population of New Zealand scarcely exceeds one million, and the problem of studying the climatology and meteorology of this long, narrow strip of sea-engirdled land is in consequence enormously greater than that of studying similar conditions in any European country.

The Meteorological Office has, until now, been under the Marine Department of the Government, and has been viewed more from the standpoint of weather than from that of climate by the authorities. The principal duties expected from the Office are the prediction of weather for the sailor and the farmer, and for this purpose arrangements have been made for the establishment of a considerable number of second order stations in the Dominion, and for obtaining telegraphic reports from a few points in Australia. There has recently been added a wireless service from Macquarie Island in the Southern Ocean, and from the Chatham Islands in the Pacific Ocean, but the total number of stations, the data of which have to be compared, is regrettably small. New Zealand is fortunate in possessing in Mr. Bates a born forecaster, who, though he works by rule, has a natural instinct for the interpretation of the phenomena with which he deals, and he certainly deserves the extraordinary personal popularity which he enjoys on land and sea in every part of the Dominion. To anyone accustomed to the ill-informed and captious criticism of the British public on the weather forecast submitted to them daily, the confidence with which all the affairs of life are arranged on the suggestions of the New Zealand weather forecast, appears the most wonderful thing in the meteorology of that country. It may be that the weather conditions there are simpler and the prognostics therefore less liable to misinterpretation than they are in the more complicated conditions of western Europe; it certainly appeared

to me that the changes and movements of clouds in New Zealand were more expressive of weather change than those at home, and Mr. Bates makes large use of the appearance and movements of clouds in filling up the gaps in his telegraphic reports.

Of the meteorological stations which I visited, the most complete was naturally that at Wellington, in connection with the Meteorological Office. It is situated at sea-level and amongst its self-recording instruments there is a Dines' anemometer, the indications of which can be compared with those of a similar instrument established at the wireless telegraphic station a few miles distant, at an elevation of nearly 1000 feet. It was a little remarkable to find that the sunshine recorder was provided with cards graduated for the northern hemisphere, so that the morning record was on the p.m. half, and the evening record on the a.m. half of the card. The point is a slight one, but affords a very striking demonstration of the fact that the sun in the southern hemisphere travels around the sky from right to left, instead of from left to right, as in the northern. The highest meteorological station which I visited was that on the slopes of Mt. Egmont, or as the Maoris poetically named it, Taranaki, the Cloud Piercer. It is a simple climatological station at an altitude of nearly 3000 feet, and from its position just above the tree line, on the side of the great cone which sweeps upwards in isolated grandeur from the surrounding plain, it is peculiarly adapted for a high level station, and will be one day, I hope, supplemented by observations on the actual summit, 8250 feet above the sea. The meteorological stations in Auckland and Christchurch were both thoroughly efficient and admirably kept, but of all those which I saw in New Zealand the most distinctive was that in the Park at Rotorua, in the centre of the Hot Lake District. Rotorua may be looked upon from the tourist point of view as the heart of Old New Zealand, the centre of the picturesque Maori life and the paling surrounding the meteorological instruments takes the quaintly appropriate form of the palisade of a Maori *Pah*, with the large grave faces of the ancestral carvings capping the posts.

It is altogether surprising to find how solid a beginning has been made in meteorological investigation in a country where, as we were reminded by an inscription in the Bay of Islands, the first missionary landed among cannibals on December 25th, 1815, and where Colonial Government only commenced in 1840; and there are strong indications of rapid development in scientific research, as well as in material progress, amongst the rising generation of native born New Zealanders, whose ancestral character has already laid the foundation of a New Britain, reflecting all the robust qualities of the Mother Country.

# BRITISH ASSOCIATION AUSTRALIA MEETING, METEOROLOGICAL LUNCHEON.

By Ernest Gold, M.A.

The Meteorological Luncheon was held at the Grand Hotel, Melbourne, on Tuesday, August 18th, immediately before a deputation of Cosmical Physicists waited on the Prime Minister to urge the importance of establishing an Observatory of Solar Physics in Australia. Mr. Hunt, Commonwealth Meteorologist, presided over a company which included Mr. Hutchinson, the Minister of Agriculture, Mr. Knibbs, the Commonwealth Statistician, and two representatives of the Australasian Steamship Owners' Federation, viz., Mr. W. T. Appleton, Managing Director of Huddart Parker, Ltd., and Mr. D. J. Syme, Chairman of Directors, Melbourne Steamship Company. The following is a list of those present :—

Dr. C. G. Abbot
The Minister of Agriculture
E. C. Andrews
G. F. Ainsworth
W. T. Appleton
J. R. Baldwin
R. J. A. Barnard
Prof. E. W. Brown
H. Buckley
Dr. Cameron
Mrs. Cameron
Dr R. T. Chamberlin
Prof. W. M. Davis
H. T. Ferrar
E. L. Fowles
E. Gold
Mrs. Gold
W. Catton-Grasby
R. F. Griffiths
Dr. T. H. Havelock
H. A. Hunt
H. M. Joscelyne
G. H. Knibbs
Dr. A. Lauder
W. F. Lawry
Prof. S. B. McLaren
Prof. Albrecht Penck
E. T. Quayle
A. E. V. Richardson
Miss Seward
Dr. G. C. Simpson
D. Y. Syme
Griffith Taylor
Prof. H. H. Turner

After the toast of "The King," and a few words of welcome from the Chairman, Professor H. H. Turner proposed the toast of "Australian Meteorology." As several of those present had to leave early for the deputation to the Prime Minister, Prof. Turner craved the indulgence of the company while he sang a song which would be briefer than a speech. The song met with such approval that I have asked Prof. Turner to allow it to be published here. It runs :—

## A SONG OF METEOROLOGY.

*Melbourne*, 1914.

Some talk of Astrophysics, and some of Educa-
Tion, while shells and bullets whizz, sixteen thousand miles away,*
No disrespect is meant them, nor yet to Botany,
If we sing just now, with a tow-row-row, of Meteorology.

* Really only 13,000, but that won't rhyme.

Some use the millimetre, and some the millibar,
And for the Thermometer, there's Reaumur, Cent., and Fahr.;
But we'll sink all such distinctions, united let us be,
When we sing right now, with a tow-row-row, of Meteorology.

Some like the Dirigible, and some the Aeroplane,
We need not stop to quibble, the points of both are plain;
But let me make confession, the dream of bliss for me,
Is to go to the moon with a "sounding balloon," for Meteorology.

There's some that's fond of roses, in gardens or in rooms,
And some of country posies, and some of hothouse blooms;
Let each man have his fancy, the *Rose of the Winds* for me,
That lovely flower I draw by the hour for Meteorology.

We sometimes toast "Our Sweethearts," and sometimes "Absent Friends,'
Both these will cause to beat hearts, till human nature ends;
But I pray you drink in bumpers, the toast that appeals to me.
Which is "Hip Hooray for Australia, and Meteorology."

*Tune*—"*The British Grenadiers.*"

The Minister of Agriculture proposed the toast of the "Overseas Members." He said how delighted he had been to meet so many of the distinguished scientists who had come to take part in this Congress in Australia. He had noted the keen interest and enthusiasm for scientific development and research in the subject with which he was more intimately associated, and which depended so much for its practical success in Australia, upon a knowledge of the weather from day to day, and from season to season. He did not doubt that the same keenness characterized the meteorologists and he hoped that their efforts would meet with the success which they deserved.

Mr. Gold replied on behalf of the overseas members, who had met everywhere with the most cordial hospitality. They had expected much after the speech at Sheffield, in which Sir George Reid invited them to come to Australia, but the heartiness of Australian welcome exceeded their expectations.

He had been impressed by the way in which every newspaper published not merely a forecast or weather report, but a daily chart showing the distribution of the meteorological elements over the whole continent. A great future lay before meteorology in Australia, and he anticipated that seasonal forecasts would, before long, find successful application there. He might be permitted to say a few words on a department with which he had been closely associated, and following Professor Turner's example he would give them in rhyme.

THE BALLAD OF THE STRATOSPHERE.

I am the rolling Stratosphere,
I long to perturbate;
So I tickle the top of the troposphere
To make him undulate.

My temperature is 215 (two-fifteen),
On Kelvin's absolute scale,
Though it's never been taken in a louvred screen.
It has in a comet's tail.

I rule the air beneath my feet,
I'm in a stable state,
When the sun is shining through a cirrus sheet
My base I elevate.

I was discovered, most men agree,
By Teisserenc de Bort;
From Trappes his balloons he sent floating free
Through my "Great Inversion" floor.

In England Dines has found me out
With instrument so light;
And my secrets he's sought with courage devout,
And correlation might.

But no correlation ratio,
For kilometres nine,
Can explain to me why a small shallow low
Brings rain from the land of wine.

Where Simpson made a dash for me
Antarctic East wind blows;
So he tried calm days when (see Admiral B.),
Smoke vertically rose.

I am the rolling Stratosphere,
I keep, need I relate,
By the radiation of the Atmosphere
In a thermal steady state.

At the request of the Commonwealth Statistician Professor Penck spoke on behalf of the foreign guests. He expressed his great pleasure at being present at that gathering and his deep sense of the kindness which was shown to him everywhere. Among so many new impressions one in particular had appealed especially to him, viz., the difficulty of making a forecast which applied to a continent, and the successful way in which the meteorologists of Australia were doing this.

# Correspondence.

*To the Editor of Symons's Meteorological Magazine.*

## PROPOSED RE-ARRANGEMENT OF THE SEASONS.

In 1905 I sent to *Nature Notes* (now called *The Selborne Magazine*) a statement of my views on the above subject. I proposed to commence Spring on March 21st, and to extend it only as far as May 21st. Summer would begin on May 22nd, and continue until September 23rd. Autumn would occupy the period from September 24th to November 20th. Winter would extend from November 21st to March 20th. In *Nature Notes* I mention the fact that immediately after the Vernal Equinox the mean temperature rapidly ascends, tending to show that the real, living, active Spring commences about then.

My Winter has 120 days (leap-year 121); Spring has 62; Summer has 125; and Autumn has 58. Winter and Summer I call "predominant" seasons; Spring and Autumn "transitional." Winter and Summer are divided into early, mid, and late. The subject bristles with difficulties. With blackbirds and thrushes singing in the third week of January, amidst hazel-catkins, early snowdrops, and "rathe primroses," the season is already Spring, while mid-March, with its frosts, and occasionally a blizzard, tells us that Spring, even then, has not fairly commenced.

E. G. ALDRIDGE, F.R.Met.Soc.

*Barnstable, November 20th*, 1914.

## SEASONAL LIMITS.

It may be, as Mr. Brodie suggests, reasonable to count summer as from the middle of May to the middle of September, and winter from the middle of November to the middle of March. But it is impossible to define the seasons logically, both with regard to the sun and air temperature, and neither point can be ignored in reference to the general climatic effect. For instance, according to the classification in use, or Mr. Brodie's, the latter part of winter has more daylight and stronger sun than the late autumn. This objection could only be avoided by arranging the winter season so as to make its middle day December 22nd; but in that case the early winter would be, normally, warmer than early spring.

G. WESTON.

*The Vicarage, Bethersden, Kent, 2nd December*, 1914.

The communication on Seasonal Limits, by Mr. Brodie, in your November issue, certainly suggests a very drastic change, and once again monthly periods are assailed. In my judgment, as a worker

for over 50 years, the months are the best divisions of the year, perhaps borrowing for February a day from both January and March.

The practice which has been so generally followed of grouping the several months into seasons, seems to have given satisfaction hitherto, and it has the advantage of being adpoted by all workers.

Whatever limits are assigned to the seasons, there must be at times winter in summer and summer in winter. Our weather is occasionally abnormal, why object to recording it as such? If hot days occur in the early part of September, as in 1906 and 1911, there are Septembers with cold days, as in 1912. In 1895 the hottest day of the year, 87°, occurred at Greenwich on September 24th, and in 1907 the hottest day of the year occurred on September 25th; neither of these would fall in Mr. Brodie's summer season.

Meteorologists are sorely tried just now with the new units of measurement, we scarcely want any shuffling up of our seasons, with no available standards for comparison.

CHAS. HARDING.

65. *Holmewood Gardens, Brixton Hill, 3rd December,* 1914.

## RAIN IN THE LAST WEEK OF NOVEMBER.

The first occasion on which we have had more than three consecutive falls of an inch in this century. The great proportion of it fell at night, and there was no abnormal flood even yesterday.

| Nov. 24. | Nov. 25. | Nov. 26. | Nov. 27. | Nov. 28. | Nov. 29. | Nov. 30. | Total. |
|---|---|---|---|---|---|---|---|
| ·31 in. | 1·60 in. | 1·20 in. | 1·29 in. | 1·09 in. | 2·94 in. | ·33 in. | 8·76 in. |

Total for November, 16·02 in. on 20 days.

GORDON WORDSWORTH.

*The Stepping Stones, Ambleside, 1st December,* 1914.

## RAINFALL COMPARED WITH THE AVERAGE.

The record of rainfall here, now extending to sixty-four years, affords a basis for comparison with the dry period which began in April last, and seems hardly yet to have come to an end. The rainfall of the seven months, April to October of this year, as compared with the average, is as follows:—

| | April. in. | May. in. | June. in. | July. in. | August. in. | Sept. in. | Oct. in. | Total. in. |
|---|---|---|---|---|---|---|---|---|
| 1914 .. | ·64 | 1·38 | 1·60 | 1·65 | ·55 | 1·00 | 1·40 | 8·22 |
| Mean 1851-1910 | 1·57 | 1·82 | 2·11 | 2·45 | 2·23 | 2·04 | 2·49 | 14·71 |

Though each month is decidedly below the mean of sixty years, yet no single month is absolutely the driest since 1851; but the total of the seven months is so, the nearest approach being in 1911. with 8·39 in.

If, however, we confine our attention to the four summer months, June—September, the case is not quite so exceptional.

| June—Sept. | | | |
|---|---|---|---|
| 1887. | 1911. | 1913. | 1914. |
| 4·70 in. | 4·20 in. | 4·79 in. | 4·80 in. |

There have been three drier summers during the period, but it will be seen that two of them are quite recent, in fact within the cycle of dry years through which we seem to be passing. At any rate it is worthy of note that the last four summers include three of the four driest since 1851. H. S. TABOR, F.R.Met.Soc.

*Fennes, Braintree, 27th November,* 1914.

## ROYAL METEOROLOGICAL SOCIETY.

THE first meeting of this Society for the Session was held on November 18th, at the Surveyors' Institution, Great George Street, Westminster. The chair was taken by Dr. H. N. Dickson, who explained that the President, Mr. C. J. P. Cave, M.A., was serving with the British forces on the continent.

A paper on "Isomeric Rainfall Maps of the British Isles," by Dr. H. R. Mill and Mr. Carle Salter, was read by the latter. In a paper too long to summarise adequately the authors referred to the earlier work of Mr. F. Gaster in *British Rainfall,* 1867 and 1868, and of Mr. H. Mellish, who submitted to the Society in 1900, maps, showing the percentage of annual rainfall which fell in each season, for the period 1866-1890, and was probably the first to treat the matter cartographically. The results of these authors were now largely confirmed, but it was shown that ten years was too short a period for variations due to exceptionally wet months to be smoothed out. The period now considered was the 35 years, 1875 to 1909, and the number of stations used was about 300, as uniformly distributed as possible. This period, although not fixing the monthly averages, probably indicates the normal type of seasonal march. The average monthly rainfall was expressed as a percentage of the average annual fall at each station, and the results were shown cartographically in twelve monthly and four seasonal maps, which are termed isomeric, the lines upon them indicating equal proportions of the annual average fall. The most interesting features were the occurrence of two types of seasonal march. The western, or wet districts, have a maximum fall in winter and a minimum in summer, while the eastern or dry districts show a maximum in summer and a minimum in winter. The equinoctial maps show the transitional stages between these two extremes, the spring months having everywhere a low rainfall, and small range, with a central maximum inland and a peripheral minimum around the coast, and the autumn months a large rainfall with a central minimum and a peripheral maximum. It was

shown that there is strong evidence for believing that the seasonal march depends upon the geographical position of the station.

Col. H. Mellish said that the results were substantially the same as those he arrived at in dealing with the 25 years 1866 to 1890. He found that January was the wettest month in the wet parts of the country, and very nearly the driest in some parts of the east of England. The lengths of the months considerably affected the averages, *e.g.*, in Nottingham the months January to April had nearly equal average rainfall, but the daily average showed January to be the driest and March the wettest of the four.

Mr. W. Marriot exhibited a series of slides showing various types of the seasonal march of rainfall.

Mr. J. Edmund Clark discussed 89 years' observations at York, in periods of varying length, the results going to prove the futility of short period workings for monthly averages.

Mr. E. Gold remarked that the isomeric distribution indicated that part of rainfall least liable to local variations depending upon elevation. Generally speaking places of high rainfall were also places of high temperature throughout the whole series.

Mr. L. C. W. Bonacina commented on the double oscillation between summer and winter and between spring and autumn rainfall. It would be interesting to ascertain if possible how much of the excessive rainfall of the west was due to orographic effect, and how much was cyclonic rainfall.

Mr. A. P. Jenkin, Mr. C. Harding, and Dr. H. N. Dickson then spoke, and Mr. Salter replied.

A paper on "A See-saw of Temperature between England and Egypt," by Mr. J. J. Craig, M.A., was taken as read, in the absence of the author. The author was induced to examine the annual and quarterly deviation from the normal of the temperatures of south-west England and Abbassia, Egypt, for the period 1877 to 1910, and a co-efficient of correlation was found. The four months January, April, July, and October, were then dealt with for a number of stations lying in the area north-west of Egypt, and the inter-relations more closely analysed to determine the position of the line of zero correlation. The results were embodied in maps of lines of equi-correlation, from which it appears that the region considered is divided into two, one homonomous with Egypt as regards deviation of mean temperature from its normal, the other heteronomous. The line of seasonal correlation passes not very far distant from Rome and runs from south-west to north-east, but is rather more east to west in winter, and more north to south in summer.

The following new fellows were elected to the Society: Mr. Isidor Block, Mr. F. C. Broad, Mr. G. F. Courcey-Breese, Mr. H. Gibson, Mr. Arthur Middenway, Mr. F. G. Parsons, Mr. Lala Kashi Ram, Rev. A. C. Ridsdale, M.A., Mr. A. W. C. Skelton, Mr. T. P. Speirs, Mr. F. H. Whalley.

## RAINFALL TABLE FOR NOVEMBER, 1914.

| STATION. | COUNTY. | Lat. N. | Long. W. [*E.] | Height above Sea. ft. | RAINFALL OF MONTH. | |
|---|---|---|---|---|---|---|
| | | | | | Aver. 1875—1909. in. | 1914. in. |
| | | ° ′ | ° ′ | | | |
| Camden Square | *London* | 51 32 | 0 8 | 111 | 2·34 | 3·52 |
| Tenterden | *Kent* | 51 4 | *0 41 | 190 | 3·07 | 4·46 |
| Arundel (Patching) | *Sussex* | 50 51 | 0 27 | 130 | 3·54 | 4·40 |
| Fawley (Cadland) | *Hampshire* | 50 50 | 1 22 | 52 | 3·39 | 4·27 |
| Oxford (Magdalen College) | *Oxfordshire* | 51 45 | 1 15 | 186 | 2·25 | 2·66 |
| Wellingborough (Croyland Abbey) | *Northampton* | 52 18 | 0 41 | 174 | 2·23 | ... |
| Shoeburyness | *Essex* | 51 31 | *0 48 | 13 | 2·09 | 2·50 |
| Bury St. Edmunds (Westley) | *Suffolk* | 52 15 | *0 40 | 226 | 2·40 | 2·99 |
| Geldeston [Beccles] | *Norfolk* | 52 27 | *1 31 | 38 | 2·49 | 2·80 |
| Polapit Tamar [Launceston] | *Devon* | 50 40 | 4 22 | 315 | 4·07 | 4·93 |
| Rousdon [Lyme Regis] | ,, | 50 41 | 3 0 | 516 | 3·51 | 3·88 |
| Stroud (Upfield) | *Gloucestershire* | 51 44 | 2 13 | 226 | 2·77 | 3·52 |
| Church Stretton (Wolstaston) | *Shropshire* | 52 35 | 2 48 | 800 | 2·94 | 4·51 |
| Coventry (Kingswood) | *Warwickshire* | 52 24 | 1 30 | 340 | 2·61 | 3·09 |
| Boston | *Lincolnshire* | 52 58 | 0 1 | 11 | 2·05 | 2·34 |
| Worksop (Hodsock Priory) | *Nottinghamshire* | 53 22 | 1 5 | 56 | 1·98 | 2·34 |
| Macclesfield | *Cheshire* | 53 15 | 2 7 | 501 | 3·00 | 3·78 |
| Southport (Hesketh Park) | *Lancashire* | 53 39 | 2 59 | 38 | 3·16 | 3·56 |
| Arncliffe Vicarage | *Yorkshire, W.R.* | 54 8 | 2 6 | 732 | 6·12 | 10·30 |
| Wetherby (Ribston Hall) | ,, ,, | 53 59 | 1 24 | 130 | 2·34 | 3·61 |
| Hull (Pearson Park) | ,, *E.R.* | 53 45 | 0 20 | 6 | 2·34 | 2·36 |
| Newcastle (Town Moor) | *Northumberland* | 54 59 | 1 38 | 201 | 2·63 | 3·49 |
| Borrowdale (Seathwaite) | *Cumberland* | 54 30 | 3 10 | 423 | 13·59 | 22·92 |
| Cardiff (Ely) | *Glamorgan* | 51 29 | 3 13 | 53 | 4·08 | 5·32 |
| Haverfordwest | *Pembroke* | 51 48 | 4 58 | 90 | 5·16 | 5·03 |
| Aberystwyth (Gogerddan) | *Cardigan* | 52 26 | 4 1 | 83 | 4·50 | 5·08 |
| Llandudno | *Carnarvon* | 53 20 | 3 50 | 72 | 3·19 | 3·79 |
| Cargen [Dumfries] | *Kirkcudbright* | 55 2 | 3 37 | 80 | 4·35 | 6·11 |
| Marchmont House | *Berwick* | 55 44 | 2 24 | 498 | 3·21 | 4·41 |
| Girvan (Pinmore) | *Ayr* | 55 10 | 4 49 | 207 | 5·24 | 5·32 |
| Glasgow (Queen's Park) | *Renfrew* | 55 53 | 4 18 | 144 | 3·63 | 3·97 |
| Inveraray (Newtown) | *Argyll* | 56 14 | 5 4 | 17 | 7·39 | 10·37 |
| Mull (Quinish) | ,, | 56 34 | 6 13 | 35 | 6·24 | 7·18 |
| Dundee (Eastern Necropolis) | *Forfar* | 56 28 | 2 57 | 199 | 2·62 | 3·45 |
| Braemar | *Aberdeen* | 57 0 | 3 24 | 1114 | 3·76 | 6·02 |
| Aberdeen (Cranford) | ,, | 57 8 | 2 7 | 120 | 3·29 | 4·01 |
| Cawdor | *Nairn* | 57 31 | 3 57 | 250 | 2·60 | ... |
| Fort Augustus (S. Benedict's) | *E. Inverness* | 57 9 | 4 41 | 68 | 4·51 | 8·01 |
| Loch Torridon (Bendamph) | *W. Ross* | 57 32 | 5 32 | 20 | 8·90 | 11·65 |
| Dunrobin Castle | *Sutherland* | 57 59 | 3 56 | 14 | 3·25 | 4·25 |
| Wick | *Caithness* | 58 20 | 3 6 | 77 | 2·95 | 4·12 |
| Killarney (District Asylum) | *Kerry* | 52 4 | 9 31 | 178 | 5·54 | 4·81 |
| Waterford (Brook Lodge) | *Waterford* | 52 15 | 7 7 | 104 | 3·80 | 4·05 |
| Nenagh (Castle Lough) | *Tipperary* | 52 54 | 8 24 | 120 | 3·88 | 5·51 |
| Ennistymon House | *Clare* | 52 57 | 9 18 | 37 | 4·62 | 6·55 |
| Gorey (Courtown House) | *Wexford* | 52 40 | 6 13 | 80 | 3·41 | 3·38 |
| Abbey Leix (Blandsfort) | *Queen's County* | 52 56 | 7 17 | 532 | 3·28 | 3·37 |
| Dublin (Fitz William Square) | *Dublin* | 53 21 | 6 14 | 54 | 2·64 | 3·26 |
| Mullingar (Belvedere) | *Westmeath* | 53 29 | 7 22 | 367 | 3·38 | 4·38 |
| Crossmolina (Enniscoe) | *Mayo* | 54 4 | 9 16 | 74 | 5·75 | 6·46 |
| Cong (The Glebe) | ,, | 53 33 | 9 16 | 112 | 5·00 | 6·78 |
| Collooney (Markree Obsy.) | *Sligo* | 54 11 | 8 27 | 127 | 4·02 | 5·66 |
| Seaforde | *Down* | 54 19 | 5 50 | 180 | 3·86 | 5·55 |
| Bushmills (Dundarave) | *Antrim* | 55 12 | 6 30 | 162 | 3·77 | 4·85 |
| Omagh (Edenfel) | *Tyrone* | 54 36 | 7 18 | 280 | 3·66 | 5·78 |

## RAINFALL TABLE FOR NOVEMBER, 1914—*continued.*

| RAINFALL OF MONTH (*con.*) | | | | | RAINFALL FROM JAN. 1. | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Diff. from Av. in. | % of Av. | Max. in 24 hours. in. | Max. in 24 hours. Date. | No. of Days | Aver. 1875–1909. in. | 1914. in. | Diff. from Aver. in. | % of Av. | Mean Annual 1875–1909. in. | STATION. |
| +1·18 | 150 | ·70 | 30 | 18 | 22·98 | 19·40 | —3·58 | 84 | 25·11 | Camden Square |
| +1·39 | 145 | 1·37 | 30 | 19 | 24·87 | 25·28 | + ·41 | 102 | 27·64 | Tenterden |
| + ·86 | 124 | 1·00 | 30 | 16 | 27·57 | 26·58 | — ·99 | 96 | 30·48 | Patching |
| + ·88 | 126 | ·78 | 30 | 22 | 28·64 | 29·30 | + ·66 | 102 | 31·87 | Cadland |
| + ·41 | 118 | ·50 | 4 | 19 | 22·52 | 21·89 | — ·63 | 97 | 24·58 | Oxford |
| ... | ... | ... | ... | ... | 23·04 | ... | ... | ... | 25·17 | Croyland Abbey |
| + ·41 | 120 | ·73 | 15 | 21 | 17·57 | 15·81 | —1·76 | 90 | 19·28 | Shoeburyness |
| + ·59 | 125 | ·96 | 28 | 16 | 23·26 | 20·73 | —2·53 | 89 | 25·40 | Westley |
| + ·31 | 112 | ·62 | 28 | 25 | 21·66 | 18·94 | —2·72 | 87 | 23·73 | Geldeston |
| + ·86 | 121 | ·55 | 14 | 21 | 33·81 | 38·60 | +4·79 | 114 | 38·27 | Polapit Tamar |
| + ·37 | 111 | ·77 | 2 | 19 | 29·86 | 35·09 | +5·23 | 117 | 33·54 | Rousdon |
| + ·75 | 127 | ·75 | 2 | 20 | 27·10 | 25·01 | —2·09 | 92 | 29·81 | Stroud |
| +1·57 | 153 | ·68 | 4 | 20 | 29·42 | 28·04 | —1·38 | 95 | 32·41 | Wolstaston |
| + ·48 | 118 | ·77 | 2 | 20 | 26·32 | 19·19 | —7·13 | 73 | 28·98 | Coventry |
| + ·29 | 114 | ·37 | 4 | 23 | 21·47 | 17·61 | —3·86 | 82 | 23·35 | Boston |
| + ·36 | 118 | ·33 | 4 | 19 | 22·29 | 17·53 | —4·76 | 79 | 24·46 | Hodsock Priory |
| + ·78 | 126 | ·81 | 11 | 18 | 31·38 | 33·00 | +1·62 | 105 | 34·73 | Macclesfield |
| + ·40 | 113 | ·42 | 13 | 22 | 29·60 | 27·02 | —2·58 | 91 | 32·70 | Southport |
| +4·18 | 168 | ·98 | 29 | 22 | 54·74 | 51·39 | —3·35 | 94 | 61·49 | Arncliffe |
| +1·27 | 154 | ·63 | 15 | 19 | 24·60 | 22·40 | —2·20 | 91 | 26·87 | Ribston Hall |
| + ·02 | 101 | ·35 | 4 | 23 | 24·10 | 20·11 | —3·99 | 83 | 26·42 | Hull |
| + ·86 | 133 | ·53 | 15 | 26 | 25·48 | 23·99 | —1·49 | 94 | 27·94 | Newcastle |
| +9·33 | 169 | 2·86 | 29 | 21 | 114·34 | 110·47 | —3·87 | 97 | 129·48 | Seathwaite |
| +1·24 | 130 | ·80 | 30 | 27 | 37·58 | 41·92 | +4·34 | 112 | 42·28 | Cardiff |
| — ·13 | 97 | ·79 | 14 | 20 | 41·63 | 40·94 | — ·69 | 98 | 46·81 | Haverfordwest |
| + ·58 | 113 | ·78 | 12 | 21 | 40·80 | 39·84 | — ·96 | 98 | 45·46 | Gogerddan |
| + ·60 | 119 | ·50 | 9 | 19 | 27·52 | 24·62 | —2·90 | 89 | 30·36 | Llandudno |
| +1·76 | 140 | ·91 | 27 | 17 | 38·63 | 38·13 | — ·50 | 99 | 43·47 | Cargen |
| +1·20 | 137 | ·45 | 15 | 26 | 30·93 | 23·81 | —7·12 | 77 | 33·76 | Marchmont |
| + ·08 | 102 | ·62 | 24 | 23 | 44·29 | 43·40 | — ·89 | 98 | 49·77 | Girvan |
| + ·34 | 109 | ·67 | 29 | 21 | 32·02 | 27·80 | —4·22 | 87 | 35·97 | Glasgow |
| +2·98 | 140 | 1·60 | 29 | 22 | 60·10 | 62·57 | +2·47 | 104 | 68·67 | Inveraray |
| + ·94 | 115 | 1·12 | 25 | 22 | 49·98 | 47·10 | —2·88 | 94 | 56·57 | Quinish |
| + ·83 | 132 | ·54 | 5 | 20 | 25·97 | 22·36 | —3·61 | 86 | 28·64 | Dundee |
| +2·26 | 160 | 1·02 | 2 | 19 | 31·80 | 29·96 | —1·84 | 94 | 34·93 | Braemar |
| + ·72 | 122 | ·58 | 1 | 25 | 29·30 | 24·96 | —4·34 | 85 | 32·73 | Aberdeen |
| .. | ... | ... | ... | ... | 26·80 | ... | ... | ... | 29·33 | Cawdor |
| +3·50 | 178 | 1·54 | 29 | 22 | 38·91 | 34·87 | —4·04 | 90 | 44·53 | Fort Augustus |
| +2·75 | 131 | 1·49 | 9 | 22 | 74·07 | 81·15 | + 7·08 | 110 | 83·93 | Bendamph |
| +1·00 | 131 | ·60 | 1 | 19 | 28·81 | 26·82 | —1·99 | 93 | 31·90 | Dunrobin Castle |
| +1·17 | 140 | .. | ... | ... | 26·77 | 25·46 | —1·31 | 95 | 29·88 | Wick |
| — ·73 | 87 | ·83 | 29 | 21 | 47·89 | 52·14 | +4·25 | 109 | 54·81 | Killarney |
| + ·25 | 107 | ·74 | 14 | 19 | 35·25 | 32·06 | —3·19 | 91 | 39·57 | Waterford |
| +1·63 | 142 | ·98 | 14 | 18 | 35·09 | 35·75 | + ·66 | 102 | 39·43 | Castle Lough |
| +1·93 | 142 | ·69 | 14, 29 | 19 | 41·49 | 46·34 | +4·95 | 112 | 46·52 | Ennistymon |
| — ·03 | 99 | ·89 | 15 | 19 | 31·57 | 28·38 | —3·19 | 90 | 34·99 | Courtown Ho. |
| + ·09 | 103 | ·48 | 14 | 23 | 32·51 | 31·09 | —1·42 | 96 | 35·92 | Abbey Leix |
| + ·62 | 123 | ·32 | 10 | 23 | 25·41 | 20·32 | —5·09 | 80 | 27·68 | Dublin |
| +1·00 | 130 | ·65 | 14 | 21 | 32·76 | 32·13 | — ·63 | 98 | 36·15 | Mullingar |
| + ·71 | 112 | ·88 | 29 | 22 | 46·76 | 46·44 | — ·42 | 99 | 52·87 | Enniscoe |
| +1·78 | 136 | 1·03 | 14 | 18 | 43·48 | 45·63 | +2·15 | 105 | 48·90 | Cong |
| +1·64 | 141 | ·72 | 28 | 20 | 38·37 | 40·41 | +2·04 | 105 | 42·71 | Markree |
| +1·69 | 144 | ·71 | 14 | 23 | 35·14 | 29·99 | —5·15 | 85 | 38·91 | Seaforde |
| +1·08 | 129 | 1·20 | 5 | 22 | 33·69 | 30·43 | —3·26 | 90 | 37·56 | Dundarave |
| +2·12 | 158 | ·80 | 28 | 23 | 35·47 | 34·94 | — ·53 | 99 | 39·38 | Omagh |

## SUPPLEMENTARY RAINFALL, NOVEMBER, 1914.

| Div. | STATION. | Rain inches. | Div. | STATION. | Rain inches. |
|---|---|---|---|---|---|
| II. | Warlingham, Redvers Road.. | 4·37 | XI. | Lligwy ..... | 4·43 |
| ,, | Ramsgate ..... ..... | 3·24 | ,, | Douglas ..... | 4·52 |
| ,, | Hailsham ..... ..... | 4·90 | XII. | Stoneykirk, Ardwell House... | 5·06 |
| ,, | Totland Bay, Aston House... | 4·62 | ,, | Dalry, The Old Garroch..... | ... |
| ,, | Stockbridge, Ashley.. ..... | 4·57 | ,, | Beattock, Kinnelhead ..... | 7·82 |
| ,, | Grayshott ..... | 4·54 | ,, | Langholm, Drove Road ..... | 7·42 |
| III. | Harrow Weald, Hill House... | 2·70 | XIII. | Meggat Water, Cramilt Lodge | 8·47 |
| ,, | Caversham, Rectory Road ... | 2·29 | ,, | North Berwick Reservoir..... | 2·48 |
| ,, | Pitsford, Sedgebrook..... | 2·70 | ,, | Edinburgh, Royal Observaty. | 2·62 |
| ,, | Woburn, Milton Bryant..... | 3·05 | XIV. | Maybole, Knockdon Farm ... | 4·23 |
| ,, | Chatteris, The Priory..... ... | 2·06 | XV. | Ballachulish House ..... | 11·38 |
| IV. | Elsenham, Gaunts End ..... | 2·78 | ,, | Campbeltown, Witchburn .. | 5·81 |
| ,, | Colchester, Hill Ho., Lexden | 2·20 | ,, | Holy Loch, Ardnadam..... | 9·65 |
| ,, | Ipswich, Rookwood, Copdock | 2·60 | ,, | Islay, Eallabus ..... | 7·24 |
| ,, | Blakeney..... . .. | 2·57 | ,, | Tiree, Cornaigmore ..... | 5·71 |
| ,, | Swaffham ..... | 2·20 | XVI. | Dollar Academy ..... | 4·24 |
| V. | Bishops Cannings ..... | 4·19 | ,, | Balquhidder, Stronvar..... | 10·03 |
| ,, | Wimborne, St. John's Hill ... | 6·67 | ,, | Glenlyon, Meggernie Castle.. | 10·34 |
| ,, | Ashburton, Druid House..... | 8·59 | ,, | Blair Atholl ..... | 5·71 |
| ,, | Cullompton ..... ..... | 3·08 | ,, | Coupar Angus ..... | 3·71 |
| ,, | Lynmouth, Rock House .. ... | 5·46 | ,, | Montrose, Sunnyside Asylum. | 3·28 |
| ,, | Okehampton, Oaklands... ... | 5·13 | XVII. | Alford, Lynturk Manse ..... | 4·57 |
| ,, | Hartland Abbey..... | 3·81 | ,, | Fyvie Castle ..... | 4·32 |
| ,, | Probus, Lamellyn..... | 5·13 | ,, | Keith Station .. ..... | 4·78 |
| ,, | North Cadbury Rectory..... | 3·70 | XVIII. | Rothiemurchus ..... | 6·17 |
| VI. | Clifton, Pembroke Road..... | 4·28 | ,, | Loch Quoich, Loan ..... | 27·20 |
| ,, | Ross, The Graig ..... ... | 2·88 | ,, | Drumnadrochit..... | 6·48 |
| ,, | Shifnal, Hatton Grange..... | 2·90 | ,, | Skye, Dunvegan ..... | 8·61 |
| ,, | Droitwich..... ..... | 2·14 | ,, | Lochmaddy, Bayhead ..... | 4·50 |
| ,, | Blockley, Upton Wold..... | 3·86 | ,, | Glencarron Lodge ..... | 13·00 |
| VII. | Market Overton..... | 3·60 | XIX. | Invershin ..... .. | 3·45 |
| ,, | Market Rasen ..... | 2·01 | ,, | Melvich ..... | 5·29 |
| ,, | Bawtry, Hesley Hall ..... | 2·12 | ,, | Loch Stack, Ardchullin ..... | 9·16 |
| ,, | Derby, Midland Railway..... | 3·63 | XX. | Skibbereen Rectory ..... | 4·57 |
| ,, | Buxton ..... | 6·44 | ,, | Dunmanway, The Rectory .. | 5·52 |
| VIII. | Nantwich, Dorfold Hall ..... | 3·47 | ,, | Glanmire, Lota Lodge..... | 3·18 |
| ,, | Chatburn, Middlewood ..... | 7·40 | ,, | Mitchelstown Castle..... | 3·98 |
| ,, | Cartmel, Flookburgh ..... | ... | ,, | Darrynane Abbey..... | 3·59 |
| IX. | Langsett Moor, Up. Midhope | 6·03 | ,, | Clonmel, Bruce Villa ..... | 2·94 |
| ,, | Scarborough, Scalby ..... | 3·92 | ,, | Newmarket-on-Fergus, Fenloe | 4·35 |
| ,, | Ingleby Greenhow ..... | 3·61 | XXI. | Laragh, Glendalough ..... | 4·64 |
| ,, | Mickleton ..... | 6·70 | ,, | Ballycumber, Moorock Lodge | 3·87 |
| X. | Bellingham, High Green Manor | 4·70 | ,, | Balbriggan, Ardgillan ..... .. | 3·08 |
| ,, | Ilderton, Lilburn Cottage ... | 4·50 | XXII. | Woodlawn ..... | 5·77 |
| ,, | Keswick, The Bank..... | 8·29 | ,, | Westport, St. Helens ... . ... | 5·37 |
| XI. | Llanfrechfa Grange ..... | 5·86 | ,, | Dugort, Slievemore Hotel ... | 8·82 |
| ,, | Treherbert, Tyn-y-waun ..... | 10·73 | ,, | Mohill Rectory ..... | 4·46 |
| ,, | Carmarthen, The Friary ..... | 5·80 | XXIII. | Enniskillen, Portora..... | 5·16 |
| ,, | Castle Malgwyn [Llechryd]... | ... | ,, | Dartrey [Cootehill] ..... .. | 4·53 |
| ,, | Crickhowell, Tal-y-maes..... | 6·50 | ,, | Warrenpoint, Manor House .. | 3·50 |
| ,, | New Radnor, Ednol ..... | 6·30 | ,, | Banbridge, Milltown ..... | 2·94 |
| ,, | Birmingham WW., Tyrmynydd | 8·90 | ,, | Belfast, Cave Hill Road ..... | 5·69 |
| ,, | Lake Vyrnwy ..... | 5·71 | ,, | Glenarm Castle..... ... | .. |
| ,, | Llangyhanfal, Plâs Draw..... | 3·26 | ,, | Londonderry, Creggan Res... | 4·42 |
| ,, | Dolgelly, Bryntirion..... | 6·35 | ,, | Dunfanaghy, Horn Head ... | 7·09 |
| ,, | Bettws-y-Coed, Tyn-y-bryn... | 7·18 | ,, | Killybegs ..... | 7·73 |

# THAMES VALLEY RAINFALL. —— NOVEMBER, 1914.

Symons's Meteorological Magazine

Watershed of River Thames above Teddington, and River Lee above Feildes Weir.

Rainfall Stations reporting ● Isohyetals.

## THE WEATHER OF NOVEMBER.

THE weather was generally mild and unsettled at the beginning of the month. A depression which moved across the south-west of England caused heavy rain over Devon and Cornwall on the 1st and over the Thames Valley on the 2nd. The fall on the 2nd amounted to 1·96 in. at Shrewton, Salisbury Plain, where heavy showers of rain and hail with some thunder and lightning lasted for about 20 hours. Many other stations in Wiltshire had more than 1·50 in. of rain, frequently accompanied by thunder. Temperature was unusually high, records above 55° in the shade occurring in all parts of the Kingdom between the 3rd and the 6th. In the south and east of England 60° was recorded generally, and in London and Margate 62°. A depression which travelled in a northerly direction from the Bay of Biscay on the 5th caused heavy rain over Ireland, the heaviest falls being in the north-east. At Belfast, where there was hail and thunder, the fall was 1·51 in. Local thunderstorms occurred in the South Midlands on the 6th. At Boxmoor, where the lightning was very vivid between 2 and 3 p.m., ·46 in. of rain fell in less than an hour. Anticyclonic conditions prevailed over the southern part of the Kingdom at the end of the first week and fair weather was experienced over England, but in Scotland and Ireland the conditions were less settled. Low pressure irregularities passing eastward across the Kingdom caused showers and frequent squalls in most districts during the second week. On the 11th, the wind force at Rousdon was 44 miles per hour from 3.30 to 4.15 p.m. More than 2·00 in. of rain fell at stations in the Lake District on the 12th. A deep depression passed across Ireland and the south of England to the Continent on the 14th and 15th causing heavy rain, with considerable falls of snow over the central and northern parts of Great Britain. About 1·50 in. of rain fell at several stations in the west of Ireland on the 14th and a similar amount in the south-east of England on the following day. At Southwell the snow was 4 inches deep and at West Witton 6¾ inches. Thunder and lightning were reported at Torquay, Ventnor and elsewhere on the south coast. An anticyclone, which increased in intensity, spread over the Kingdom on the 16th, and fair, cold weather became general. Severe frosts occurred in all districts except the south of England. At Balmoral the shade minimum on the 18th was 14°, at Kilmarnock 19°, and it was only slightly higher at many other stations in Scotland. Slight snow fell over the south-east of England on the 19th. A series of depressions passed across the Kingdom from the west during the latter days of the month and caused unsettled or rough weather generally. Heavy rain occurred along the western coasts on the 25th, the fall amounting to 1·81 in. at Inveraray, and 1·66 in. at Delphi Lodge (Co. Mayo). On the 29th more than 2 in. fell at many stations in the west of Great Britain and at Killin 3·00 in. was measured. Heavy rain fell at widely distributed stations on the last day. In the south of England it was accompanied by a strong south-west wind. Many places had 1·50 in. of rain, and at Hailsham there was 1·75 in. At Aberfeldy the River Tay was in high flood.

In London the weather was generally dull, showery and mild throughout, with fog or mist on several mornings. The mean temperature at Camden Square, 45°·1, was 1°·6 above the average. The duration of sunshine was 49·2 hours, and rainfall 58·4 hours, measuring 3·52 in. Evaporation 28 in.

The total rainfall of the month was under 3·00 in. along nearly the whole of the east coast and in the South Midland counties, and less than 2·00 in. in the Fen District. Some high level stations in South Wales and Snowdonia had more than 10 in., and in the Lake District there was an area with more than 20 in. of rain. The Western Highlands were, as usual, very wet, a large area having more than 15 in., and at Loan there was 27 in. In Ireland the amounts ranged from about 3 in. in the south-east to more than 10 in. on the high land of Co. Mayo. The total rainfall expressed as a percentage of the average was as follows: England and Wales, 133; Scotland, 133; Ireland, 124; and of the British Isles, 130.

## Climatological Table for the British Empire, June, 1914.

| STATIONS. (*Those in italics are South of the Equator.*) | Absolute. Maximum. Temp. | Date. | Minimum. Temp. | Date. | Average. Max. | Min. | Dew Point. | Humidity. | Absolute. Max. in Sun. | Min. on Grass. | Total Rain Depth. | Days. | Aver. Cloud. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ° | | ° | | ° | ° | ° | 0-100 | ° | ° | inches | | |
| London, Camden Square | 89·0 | 30 | 41·5 | 8 | 73·9 | 50·8 | 51·9 | 73 | 134·4 | 41·2 | 1·15 | 12 | 4·3 |
| Malta ... ... ... | 86·0 | 25 | 60·5 | 8 | 75·3 | 65·1 | ... | 71 | 132·0 | ... | ·00 | 0 | 1·1 |
| Lagos ... ... ... | 88·0 | 11 | 70·0 | 13 | 84·5 | 73·9 | 73·3 | 84 | 156·0 | 67·0 | 23·74 | 27 | 8·7 |
| *Cape Town* ... ... | 78·6 | 23 | 35·7 | 28 | 63·5 | 46·7 | 48·9 | 80 | ... | ... | 3·97 | 12 | 4·7 |
| *Natal, Durban* ... | 70·0 | 19 | 46·0 | 30 | 63·6 | 55·0 | 50·0 | 66 | ... | ... | ·31 | 3 | 3·5 |
| *Johannesburg* ... ... | 66·2 | 1 | 26·0 | 28 | 59·4 | 40·4 | 35·8 | 69 | ... | 23·5 | ·19 | 1 | 2·2 |
| *Mauritius* ... ... | 81·7 | 7 | 60·6 | 29,30 | 77·4 | 66·1 | 63·6 | 77 | ... | 51·1 | 5·14 | 15 | 5·4 |
| *Bloemfontein* .. ... | 66·4 | 7 | 26·6 | 28 | 58·6 | 34·5 | 32·6 | 73 | ... | ... | ·23 | 2 | 3·6 |
| Calcutta... ... ... | 97·6 | 4 | 74·3 | 17 | 91·3 | 78·7 | 77·0 | 81 | ... | 72·1 | 9·27 | 12 | 6·8 |
| Bombay... ... ... | 93·7 | 6 | 76·4 | 22 | 89·5 | 80·7 | 78·0 | 80 | 138·0 | 67·6 | 16·69 | 25 | 6·6 |
| Madras ... ... ... | 110·3 | 1 | 76·0 | 14 | 101·7 | 82·3 | 71·0 | 61 | 165·6 | 74·2 | ·64 | 8 | 4·9 |
| Colombo, Ceylon ... | 88·1 | 11 | 73·2 | 20 | 86·3 | 76·9 | 75·5 | 82 | 160·0 | 71·2 | 10·27 | 26 | 7·8 |
| Hongkong ... ... | 89·9 | 30 | 75·1 | 1 | 86·6 | 78·9 | 74·8 | 79 | ... | ... | 12·23 | 17 | 7·4 |
| *Sydney* ... ... ... | 66·2 | 7,29 | 44·1 | 13 | 62·2 | 49·3 | 46·3 | 78 | 119·9 | 34·9 | 5·01 | 21 | 5·2 |
| *Melbourne* ... ... | 64·9 | 6 | 36·7 | 9 | 58·6 | 44·4 | 43·4 | 72 | 112·0 | 30·2 | 1·56 | 12 | 6·2 |
| *Adelaide* ... ... | 73·4 | 27 | 39·2 | *3 | 63·8 | 45·9 | 44·9 | 71 | 122·0 | 27·2 | ·65 | 8 | 4·7 |
| *Perth* ... ... ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| *Coolgardie* ... ... | 71·4 | 2 | 34·8 | 28 | 65·1 | 42·5 | 38·4 | 50 | 135·0 | 27·4 | ·32 | 5 | 2·7 |
| *Hobart, Tasmania* .. | 62·7 | 12 | 33·1 | 28 | 54·9 | 42·3 | 39·6 | 68 | 109·3 | 26·0 | ·33 | 13 | 5·4 |
| *Wellington* ... .. | 60·0 | 1,10 | 33·8 | 29 | 54·6 | 42·5 | 42·2 | 79 | 109·4 | 26·0 | 3·84 | 15 | 7·0 |
| *Auckland* ... ... | 63·0 | 1, 2 | 39·5 | 28 | 56·2 | 46·4 | 45·6 | 82 | 121·0 | 35·0 | 3·32 | 22 | 5·7 |
| Jamaica, Kingston .. | 92·6 | 26 | 70·1 | 9 | 90·3 | 73·7 | 70·3 | 73 | ... | ... | ·60 | 6 | 3·2 |
| Grenada ... ... | 86·0 | 3,10 | 72·0 | 30 | 83·7 | 75·1 | ... | 76 | 136·0 | ... | 6·85 | 22 | 6·0 |
| Toronto ... ... ... | 91·3 | 24 | 38·0 | 20 | 74·9 | 54·0 | 49·0 | 63 | 107·5 | 35·0 | 2·17 | 11 | ... |
| Fredericton ... ... | 88·0 | 24 | 26·8 | 4 | 69·1 | 44·7 | ... | 66 | ... | ... | 4·49 | 12 | 5·0 |
| St. John, N.B. ... | 81·3 | 11 | 35·7 | 9 | 62·1 | 47·2 | 44·0 | 70 | ... | ... | 4·86 | 14 | 5·3 |
| Alberta, Edmonton ... | 87·1 | 2 | 39·0 | 9 | 68·6 | 48·5 | ... | 71 | 137·5 | 36·2 | 8·43 | 17 | 6·6 |
| Victoria, B.C. ... ... | 78·0 | 14 | 42·5 | 4 | 62·7 | 49·1 | 50·0 | 76 | ... | ... | 1·67 | 6 | 4·3 |

*16 and 23.

*Johannesburg.*—Bright sunshine 279·8 hours.

*Mauritius.*—Mean temp. of air 2°·5, dew point 2°·6, and R 2·57 in., above averages. Mean hourly velocity of wind 11·4 miles.

COLOMBO, CEYLON.—Mean temp. of air 81°·6 or 0°·1 below, and R 2·03 in. above, averages. Mean hourly velocity of wind 6·2 miles. TSS on 4 days.

HONGKONG.—Mean temp. of air 82°·0, mean hourly velocity of wind 10·8 miles. Bright sunshine 174·4 hours.

*Melbourne.*—Mean temp. of air 1°·2 above, and R ·44 in. below, averages.

*Adelaide.*—Mean temp. of air 1°·5 above, and R 2·41 in. below, averages.

*Coolgardie.*—Temp. of air 1°·4 above, and R nearly one inch below, averages.

*Hobart.*—Mean temp. of air 1°·8 above, and R 1°·87 in. below, averages.

*Wellington.*—Mean temp. of air 48°·5 or 0°·9 below, average. Bright sunshine 96·3 hours. Frost on 11 days.

ALBERTA, EDMONTON. Rainfall more than double the mean for any month in Edmonton for the past 35 years except 11·88 in. in July, 1901. TSS on 5 days.